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The oxygen isotope effect on the infrared photo-induced absorption spectra of La 2CuO 4

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Abstract

The infrared photo-induced spectra of the isotope-substituted stoichiometric La 2CuO 4 samples were studied at T=20 K. Measured spectra were analyzed within the small polaron hopping theory. A small, but detectable shift of the effective phonon frequency on the substitution 16O to 18O is found for the high-energy surface carrier associated band (~4000 cm -1) and has a value of α O = 0.3 ±0.2. The low-energy band (~1500 cm -1) originating from the bulk carriers doesn't show any difference within experimental error which is fully in agreement with theory predictions. The isotope shifts of the optically active oxygen-related phonon modes are described well by the harmonic approximation.

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